

Wind Turbine and Health Effects

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WHO Definition of Health

Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.

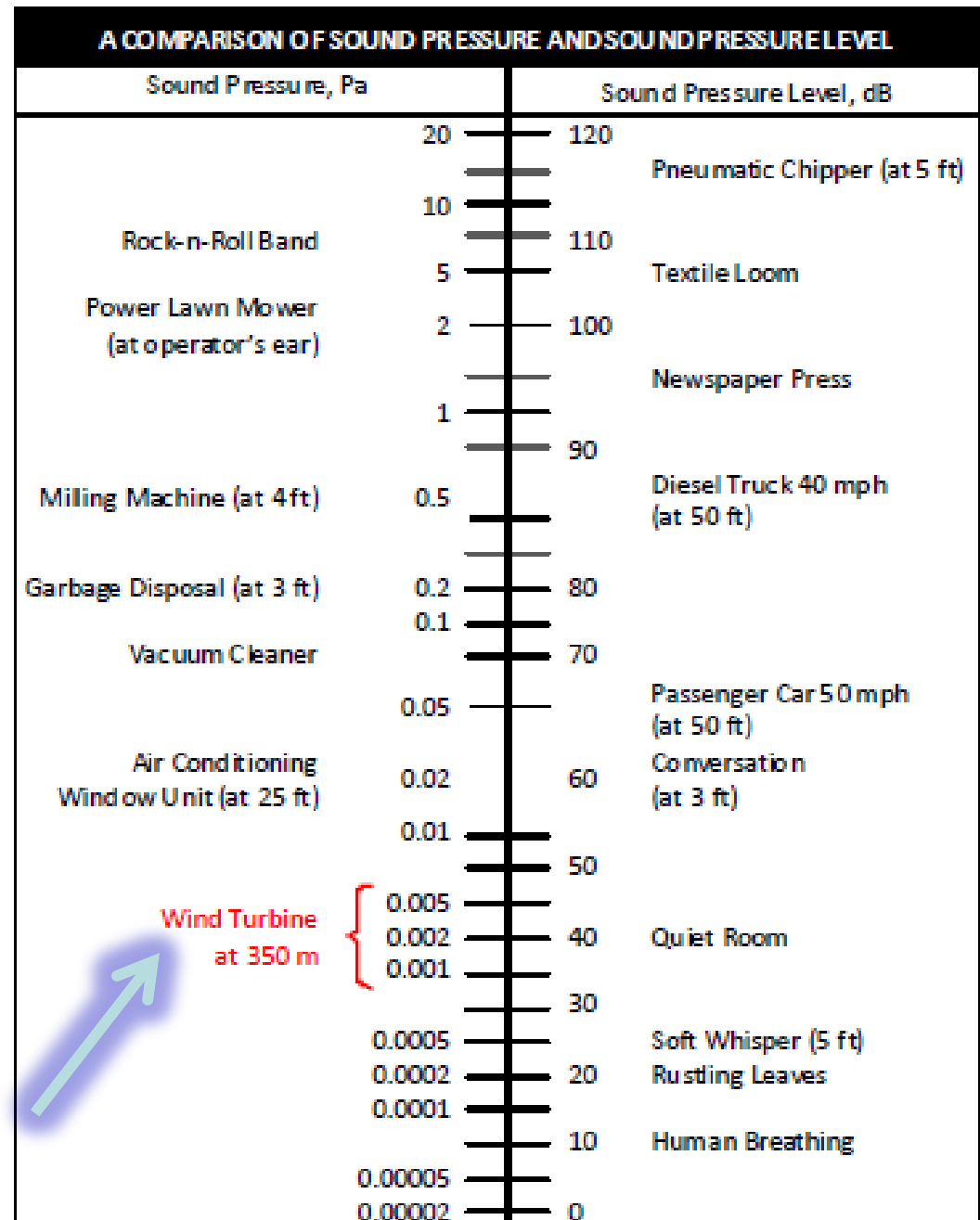
Wind Turbine Exposures

- **Noise**
 - Mechanical noise
 - Aerodynamic noise
- **Shadow Flicker**
 - Rhythmic light flicker causing intermittent shadows

Noise

- **Noise annoyance – a feeling of resentment displeasure, discomfort, dissatisfaction or offence which occurs when noise interferes with someone's thoughts, feeling, or daily activities - WHO**

Sound Pressure Level Generated by Various Methods



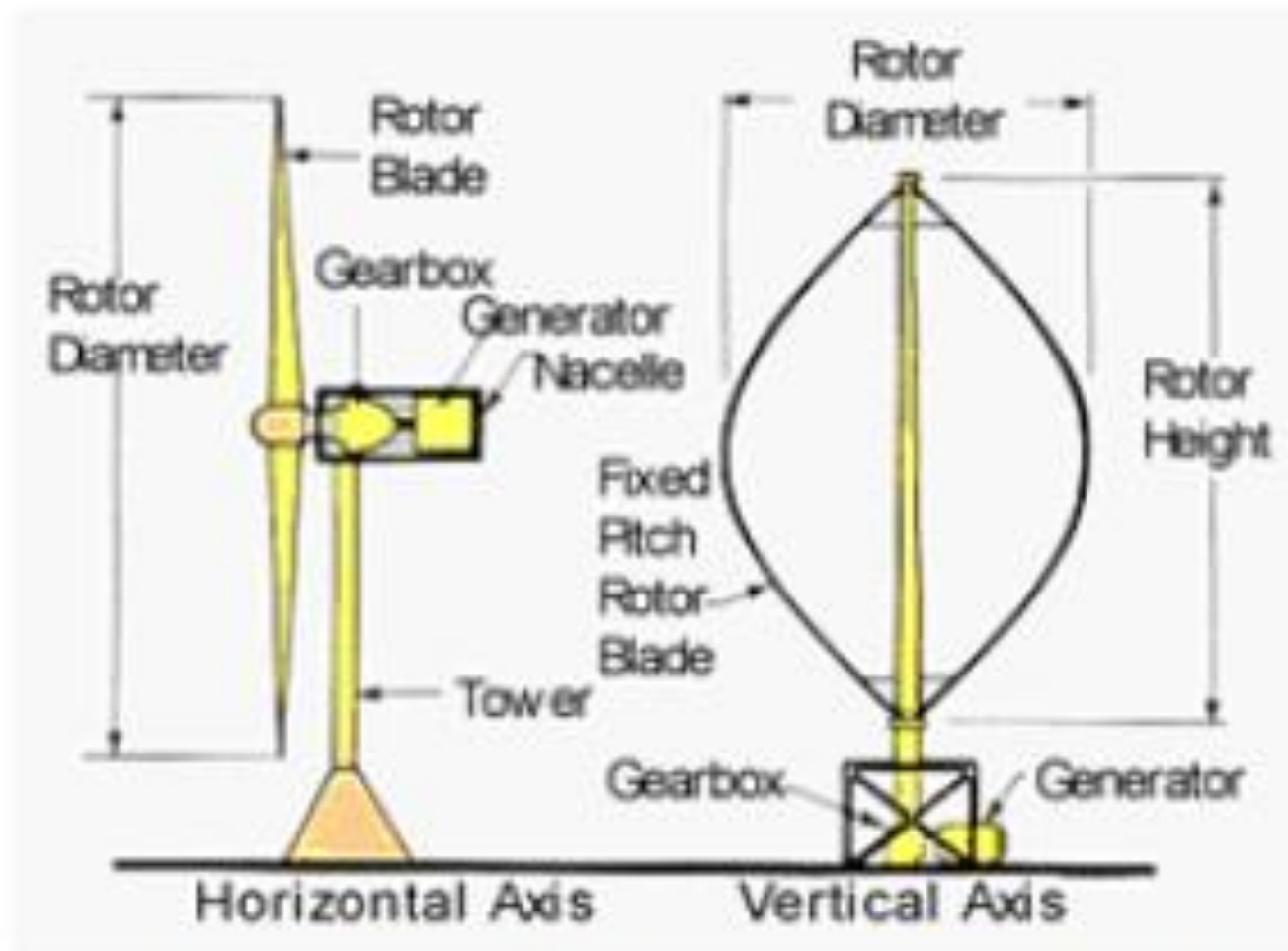


Figure 1. Typical Wind Turbine Configuration¹

Noise Annoyance

- Annoyance, unpleasant sounds, and complaints
 - Rhythmic modulation of low frequency noise may be more annoying than steady noise.
 - Increasing sound pressure level results in increased levels of annoyance
 - Annoyance reported more frequently when turbines were visible and individual reported a negative impact on landscape

Wind Turbine Syndrome

- **Etiology**
 - **Disruption or abnormal stimulation of the inner ear's vestibular system caused by turbine infrasound and low-frequency noise.**

Wind Turbine Syndrome

- Sleep problems – noise or physical sensations of pulsations or pressure
- Headaches – increasing freq and severity
- Dizziness, unsteadiness, and nausea
- Exhaustion, anxiety, anger, irritability, and depression
- Problems with concentration and learning
- Tinnitus

Internet Searches

- **Google**
 - Health Effects Wind Turbine – 758,000 hits
 - Wind Turbine Syndrome – 61,100 hits
 - Wind Turbine Health Risk – 1, 400,000 hits
- **Pub Med**
 - Wind Turbine Syndrome – 0
 - Wind Turbine Health Risk – 2
 - Wind Turbine Noise – 6
 - Wind Turbine and Health – 3

Pierpont's Case Study

Dr. Pierpont is asking anyone living near wind turbines and suffering ill health effects which he/she suspects are a result of the wind turbines to contact her at either (518) 483-6481 (Malone, New York, USA) or pierpont@westelcom.com (www.ninapierpont.com). She will do a telephone interview (takes about 30 minutes), where your identity will be held strictly confidential. What she is after is evidence and data (as with any medical research project, your identity would remain confidential, always and forever).

<http://www.savewesternny.org/health.html>

Vibroacoustic Disease

- Etiology – High levels of low frequency noise exposure, possibly lower levels of low frequency noise over years of exposure

Vibroacoustic Disease

- **Syndrome**
 - **Mild (1-4 years)** Slight mood swings, mood swings, indigestion, heartburn, mouth/throat infections, bronchitis
 - **Moderate (4-10 years)** Chest pain, definite mood swings, back pain, fatigue, skin infections (fungal, viral, and parasitic, inflammation of the stomach lining, pain and blood in the urine, conjunctivitis, allergies
 - **Severe (> 10 years)** psychiatric disturbances, hemorrhages (nasal, digestive, conjunctiva mucosa) varicose veins, hemorrhoids, duodenal ulcers, spastic colitis, decrease in visual acuity, headaches, severe joint pain, intense muscular pain, neurological disturbances.

Vibroacoustic Disease

- Google Search – 407,000 hits
- Pub Med Search – 36 hits
- High levels of vibration have been noted to cause health effects in the work place.

Key Gaps in Knowledge

- Health effects from exposure over time to LFS
- Low frequency vibration <20Hz not well understood and some may be disturbed by exposure

Noise

- Low frequency noise (LFN) may penetrate homes and be easier to perceive at night
- Annoyance related to dose response and attitude toward turbines
- Some are more sensitive threshold to LFN. Older individuals may be more sensitive

Bottom Line

- **NRC review is that wind turbine noise is generally not a major concern beyond a half mile**
- **Good epidemiological studies need to be accomplished to**
 - **compare health status between those exposed to wind turbines and those not exposed.**
 - **Impact if any of low frequency noise**

Source of Information

- **Wind Turbines, Noise and Health**
 - Dr. Amanda Harry
- **Public Health Impacts of Wind Turbines**
 - MN Dept of Health
- **Vibroacoustic Disease**
 - Seven papers by Author - Nuno Castelo Branco and others
- **Wind Turbines and Health – National Collaborating Centre for Environmental Health (Canada)**
- **Wind Turbine Sound and Health Effects – panel of experts (done for AWEA and CWEA)**